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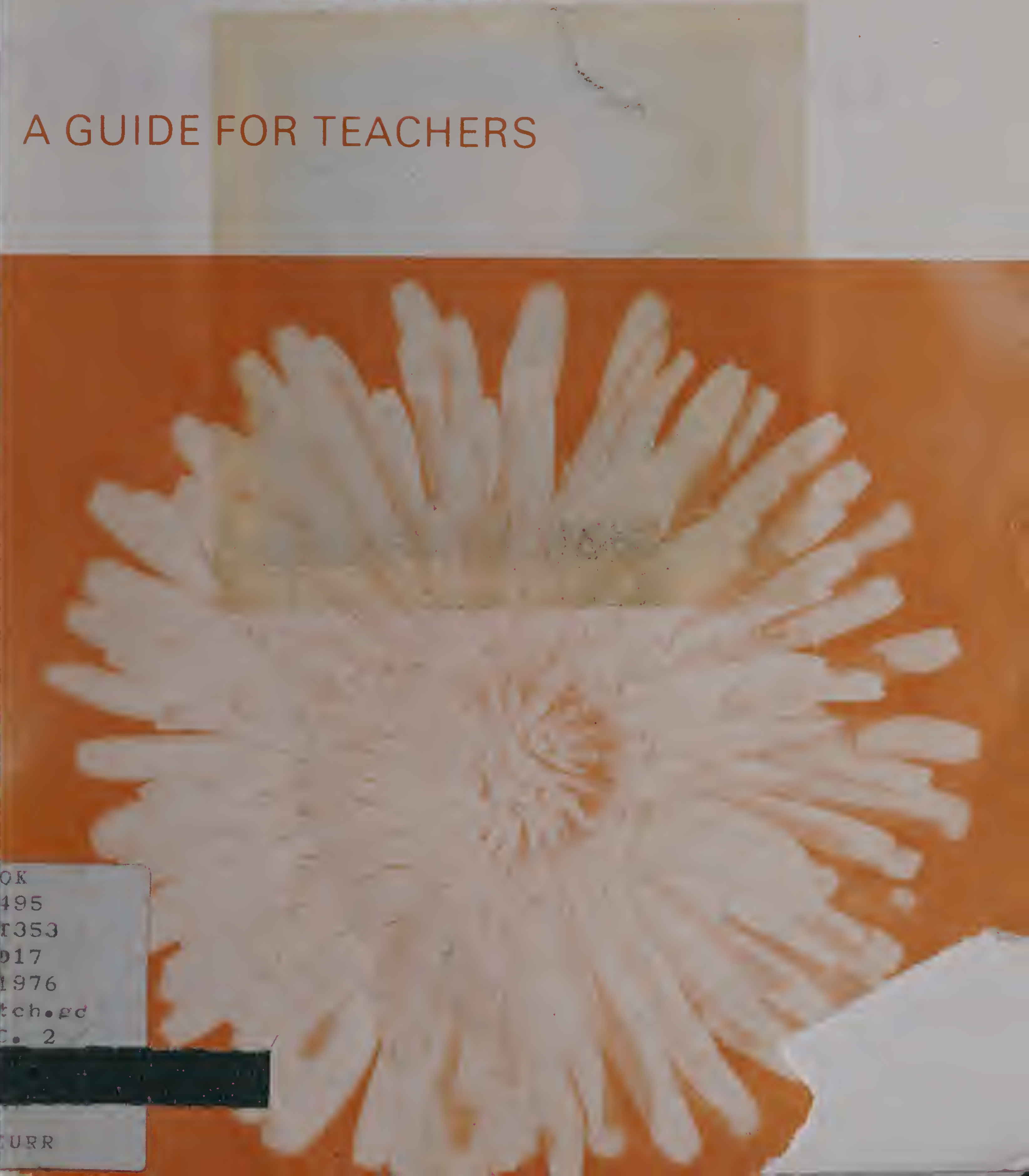
Examining Your Environment

The Dandelion

A GUIDE FOR TEACHERS



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The Dandelion

Examining Your Environment

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A GUIDE FOR TEACHERS

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INTRODUCTION

When considering a study of the environment, difficulties often arise with respect to the availability of suitable sites to investigate. Also, the sorting out of the great many components of the environment to discover logical starting points for investigation sometimes causes confusion.

In *The Dandelion,* activities center on a plant that is found almost everywhere -- from city core to the farm and from coast to coast. There is no need to make special travel arrangements to study this plant since it can be found in virtually every schoolyard or home area.

In studying the dandelion the student is exposed, in easy stages, to those broad ecological concepts arising from the interrelationships between living things and the environment. From simple beginnings the students learn about populations, adaptation, and climate, and their significance to ecology.

Most of the activities in *The Dandelion* are planned to enable the student to learn by personal experiences in the out-of-doors. In Chapter 6 the activities show how dandelion study can be integrated into the language arts, science, and geography programs in ways that should retain the students' interest at a high level.

The activities suggested for studying dandelions can be readily modified and applied to the study of any common plant found around the school or home. Indeed, it is desirable to deliberately study more than one type of plant so that worthwhile comparisons can be made between them.

Selecting Activities

The activities in Chapter 1 of *The Dandelion* should be carried out in the early spring, when the first flush of dandelion flowers appears. The activities in Chapters 1, 2, 3, and 5 are best done sequentially, since each activity leads logically into the next. In Chapters 4 and 6, the order in which the activities are done can be determined by individual choice.

Refer to the headings SKILLS AND TECHNIQUES and EQUIPMENT AND MATERIALS for each activity. Select activities that teach skills that you believe to be lacking in your students, or activities that can be used for developing interest and motivation. If you feel that the activity is suitable and enough equipment can be obtained, then organize a lesson or a series of lessons based on the activity that you have chosen. If it is impractical to carry out a particular activity, perhaps a variation of the activity can be substituted. Once the skills have been mastered, the students can be encouraged to employ them to find out more about what interests them.

Guiding Student Inquiry

Some of the photographs in the student's text show boys and girls doing investigations. These photographs illustrate techniques that might be difficult to understand. The captions usually provide questions that guide the students to interpret the main ideas and draw attention to subtleties of technique. Other photographs illustrate phenomena related to problems that the students will be investigating.

Before attempting each activity, you might direct your students to read the captions carefully. By discussing the photographs and captions in small groups or as a class, your students can gain insight into the content of the chapter. Hopefully, some photographs will stimulate questions that will lead to activities that the students themselves devise and conduct. When this happens, your students have progressed to the threshold of open-ended inquiry, the most desirable type of learning experience. The quality of these open-ended investigations will depend on the skills developed from more directed activities and on your ability to provide guidance at critical times.

Diagrams, charts, graphs, and drawings are included to guide the students in conducting their activities or to help them in recording their data. Encourage the students to use these aids. The cartoons provide enjoyment by presenting related concepts in a humorous way. There is one in every chapter of *Dandelion*. Discussion of these illustrations by students in small groups can help clarify the ideas presented in the activities.

To organize your classroom, you might set up several learning stations with different activities from the same chapter. The equipment and materials necessary for each activity should be readily available at each station or elsewhere in the classroom. The books, open at the appropriate pages, can be used as work cards. You might find it necessary to organize data-collecting sheets for the students. Some type of rotation can also be employed to take best advantage of the learning stations. For other suggestions, refer to the series overview, *Examining Your Environment, An Introduction for Teachers,* pages 31 to 37.

Since many of the activities take place outdoors, remember to inform parents and other people in the community of your plans. Be sure to obtain permission from appropriate sources and also to send out letters of thanks afterwards. These simple acts will do a great deal towards maintaining good public relations.

The sequence of steps for carrying out an activity might be:

1. The students could read the activity carefully and organize themselves to conduct the investigation from beginning to end.
2. Students could invite you to their group and outline their plans for your approval and revision, if necessary.
3. They could conduct the investigation.
4. The students could answer the *Digging Deeper* questions as well as appropriate values clarification activities suggested in this guide.
5. A reporting session can be organized so that you can gather feedback on how well the groups have progressed. The students then have a chance to report and compare their findings with other students. New avenues of investigation, as well as skill teaching and reteaching, can grow out of this reporting session.

Once the students have completed the initial investigations as a class endeavor, you might invite them to pursue new investigations. For this, you could organize the students into groups. Each group could leaf through the activities in the rest of the chapter and decide which one they wish to pursue. It will be interesting for you to see how the students make this decision. There may be implications for teaching some group interaction processes.

Capitalize on students' questions arising out of the activity that has just been completed and guide the students to devise their own activities to answer their questions. The students will require a great deal of help when they first attempt to organize their own investigations. Try to be patient and helpful, but hold them accountable for the skills that they have just learned.

How to Use this Guide

Each teacher's guide corresponds to a book in the *Examining Your Environment* series. Every activity is analysed under several headings. When using the guidebooks, you should first read the activity in the text, as this background is needed to understand the references under some headings.

TIME

The estimated time needed to complete the activity under normal circumstances is stated under this heading.

SEASON

Under this heading, the most suitable seasons for carrying out the activity are considered. Whether the activity is to take place indoors or outdoors is also indicated.

CLASS ORGANIZATION

Here hints are given as to the ideal number of students that could perform an activity. This does not mean that more than one group could not try the same activity, if this is practical. Some activities are recommended for the whole class; other activities for smaller groups.

EQUIPMENT AND MATERIALS

Listed here are the items that will be required for each group to carry out the activity.

SKILLS AND TECHNIQUES

This column lists the main skills and techniques a student will need to carry out an activity. These items should form the instructional objectives for the activity and be the criteria for most of the evaluation to follow. The information under this heading provides insight into items that may require preteaching or review.

CONCEPTS

As a result of completing the activities, the child should have gained some general knowledge. Only the major concepts have been listed. Often they have been expressed in general terms and may be oversimplified.

SUGGESTIONS FOR VALUE TEACHING

Under this heading you will find value learning statements or questions that you could use to guide the students to determine what the activity means to them. Of course, you will, no doubt, have your own original ideas as to the type of exercises that will encourage your students to gain greater meaning from their studies and you should use your thoughts to augment the suggested ones. See the section on *Value Learning* and *Clarifying Values* in *E.Y.E., An Introduction for Teachers.*

CLUES TO QUESTIONS

Because the answers often relate directly to the data collected, many of the answers to the questions in the *Digging Deeper* sections will depend upon the circumstances. Some of the factors that might be considered in answering a question have been listed.

TROUBLE SHOOTING

Under this heading is a checklist of items that could help to account for the success or failure of an activity.

VOCABULARY

Under this heading you will find words the students should be able to add to their vocabularies after completing the activity.

RESOURCES

Both the text and the bibliography contain suggestions for obtaining special materials when they are required. Under this heading are listed *other* possible sources of ideas and supplies.

CROSS REFERENCES

Reference is made to a particular book when a required skill has been more fully developed in that book or when the same apparatus can be used in another activity in the book mentioned.

1. THE TOUCH OF SPRING

Activity 1:
In what locations do most dandelion flowers first appear?

TIME
one 45-minute period to do Part A
one 90-minute period to map an area where dandelion flowers are found (to record the number of dandelion flowers and to consider the information gathered)

SEASON
May, in most areas

CLASS ORGANIZATION
groups of five or six students

EQUIPMENT AND MATERIALS
For each group:
writing materials
magnetic compass
peas
string
measuring tape
metre stick
hammer
a book or other object with a square corner

SKILLS AND TECHNIQUES
- using a magnetic compass to determine directions, N, S, E, and W
- measuring length
- organizing tasks within a group and carrying them out
- mapping an area
- setting up a belt transect

CONCEPTS
In early spring when dandelion flowers first appear they are most numerous in areas where they:
a) receive a great amount of sunlight,
b) are found on south-facing slopes,
c) are close to buildings that face the sun,
d) are close to asphalt surfaces that receive much sunlight.

SUGGESTIONS FOR VALUE TEACHING

How do you feel about dandelions? Place an "X" on the following scale to show how much you like these plants.

Dandelion Dan gathers dandelion seeds and plants them in his lawn so that they will grow like grass.

Weedless Wilma always carries a container of weed killer to spray dandelions whenever she sees them.

Share your position on the scale and your reasons with your classmates.

Teacher: You might have the students retain their scale and after the unit on dandelions has been completed, have the students repeat this valuing exercise. Discussion could center on any changes in their positions on the scale.

CLUES TO QUESTIONS
Dandelions are often more numerous close to buildings whose walls reflect the sunlight.

TROUBLE SHOOTING
- Cooperation and careful planning are required; each student should know exactly what he or she is to do.
- All dandelions with their roots within the square should be counted.

VOCABULARY
scale
population

CROSS REFERENCES
Ecology in Your Community, pages 26 to 31.
Mapping Small Places, pages 37 and 38.
Trees, pages 86 to 90.

Activity 2:
What is the temperature at the ground surface in an area where the dandelion flowers are abundant?

TIME

one 45-minute period to set up equipment and prepare the data sheet (The activity should be done within a day or two of *Activity 1* so that the marked areas can be used again.)
5-minute period each hour to record the temperature
one 45-minute period to complete the recording of data and discuss the information gathered

SEASON

May, in most areas

CLASS ORGANIZATION

groups of five or six students

EQUIPMENT AND MATERIALS

For each group:
thermometers
mailing tubes
tinfoil
masking tape
writing materials

SKILLS AND TECHNIQUES

- standardizing and reading thermometers skillfully
- drawing line graphs
- preparing and using a chart data sheet

CONCEPTS

The largest number of dandelion flowers in early spring are found where the temperatures are highest.
Standardizing thermometers assures that reasonably comparable temperature readings can be taken.

SUGGESTIONS FOR VALUE TEACHING

In these first two activities with dandelions, you have been actively involved. Think of the activities you have completed; not only what you have learned about dandelions, but the way you learned about them.

There are many ways of learning about dandelions. List the following in order of your preference:

- *watching a film about dandelions;*
- *being told by your teacher about dandelions;*
- *reading about dandelions in books;*
- *conducting activities with your classmates.*

Share the reasons for your choices with your classmates.

CLUES TO QUESTIONS

The foil-wrapped mailing tubes permitted air temperatures to be taken in a uniform way without undue influence on the thermometer by the direct rays of the sun.
If the temperatures were all the same at 12:30, it would be a reasonable assumption that temperature did not affect the number of dandelion flowers.

TROUBLE SHOOTING

- The students will have to master the skill of reading the thermometers correctly. Even the small variations that the different students display in this skill can affect the temperature readings obtained.

VOCABULARY

standardize
thermometer
variable
controlled experiment

CROSS REFERENCES

Mini-climates, pages 2, 8 to 13.

2. BECOMING ACQUAINTED

Activity 1:
What are the parts of the dandelion flower head?

TIME
75 minutes

SEASON
May or June

CLASS ORGANIZATION
individually or in small groups

EQUIPMENT AND MATERIALS
For each group:
hand lenses
writing materials
dandelion flowers
dandelion seeds
50X microscope (if possible)

SKILLS AND TECHNIQUES
- sketching accurately
- taking a flower apart
- observing carefully
- using a hand magnifier
- using a microscope (50X)

CONCEPTS
The flower of the dandelion is really a cluster of flowers or florets called a head.
Each tiny floret in the dandelion flower head produces a little one-seeded fruit or akene.

SUGGESTIONS FOR VALUE TEACHING
You have examined the flower of a dandelion carefully. How would you rank the dandelion flower with other flowers that you like?

CLUES TO QUESTIONS
The answers to the questions can be readily obtained through observation.

TROUBLE SHOOTING
- Students should have enough dandelion flowers so that they can practice taking them apart.
- Avoid getting unduly bogged down in the vocabulary of flower parts.

VOCABULARY
hand lens
floret
flower head
corolla
ray flower
pappus
pollen
microscope
involuctral bracts
anther
stigma
akene
pistil
stamen
style
receptacle

Branching Out:

TIME
45 minutes

SEASON
September, when large numbers of flowers are readily available

CLASS ORGANIZATION
individually or in small groups

EQUIPMENT AND MATERIALS
For each group:
dandelion flowers
petunia flowers
zinnia flowers
magnifying glasses

SKILLS AND TECHNIQUES
- dissecting flowers
- making careful observations and comparisons

CONCEPTS
A simple flower consists of a single bloom.
A composite flower consists of many small flowers or florets making up a flower head.

CLUES TO QUESTIONS
The structure of the dandelion flowers is such that they are self-pollinating.

TROUBLE SHOOTING
- Have sufficient quantities of flowers available so that each student can dissect several of each kind if he or she wishes.

VOCABULARY
simple flower
disk flower
composite flower

Activity 2:
What interesting observations can be made of changes in the dandelion flower head during the time that it is in bloom?

TIME

A number of brief observations of only a few minutes each must be made daily over a period of several days.
one 30-minute period to discuss the observations that were made

SEASON

May or June, when dandelion flowers are abundant

CLASS ORGANIZATION

individually or in small groups of two or three students

EQUIPMENT AND MATERIALS

For each group:
writing materials
access to many dandelion flowers growing outdoors
rulers
watches or clocks

SKILLS AND TECHNIQUES

- observing carefully
- measuring accurately
- inferring answers to questions based on careful observations

CONCEPTS

The dandelion flower head opens on sunny days and remains closed on very cloudy or dark days and at night.
The dandelion flower stem keeps the flower head facing the sun so that it receives maximum sunlight.
Just before the floret turns to seed the flower head will close for a few days. During this time the flower stem will grow considerably.

SUGGESTIONS FOR VALUE TEACHING

Think of the activity that you have just done. Complete some of the following sentences:

I wonder about ______________________________.
I wonder why ________________________________.
I wonder when _______________________________.
I wonder what would happen if _________
____.

Share your "I wonder" questions with your classmates.

CLUES TO QUESTIONS

The class should discuss and compare the observations. There will be variations in observations and possibly in some cases distinct exceptions to what is generally observed. Although the observations that are generally consistent may be accepted as answers to the questions, the students could be encouraged to speculate on the variations.

TROUBLE SHOOTING

- The same dandelion flower will have to be observed a number of times. Care will have to be taken to identify the flowers and protect them from damage until the activity is completed.
- Some special arrangements may be necessary to permit the students to make the brief observations several times a day.
- The method of recording observations should be clarified before making the observations.

Activity 3:
How does the dandelion flower stem differ from the flower stem of other plants?

TIME

45 minutes

SEASON

September, when a variety of flowers are readily available

CLASS ORGANIZATION

small groups of three or four students

EQUIPMENT AND MATERIALS

For each group:
variety of dandelion flower stems
dividers from a geometry set (a pair of compasses will also work)
variety of garden flowers
writing materials

SKILLS AND TECHNIQUES

- making accurate measurements of flower stem length and thickness
- making inferences based on careful observations and measurements when answering *Digging Deeper* questions

CONCEPTS

The stem of the dandelion is hollow.
The stem of the dandelion flower is tapered, being thicker and stronger near the ground and thinner near the flower head.
The lengths of dandelion flower stems vary greatly.
Dandelion flowers and stems wilt quite rapidly even when placed in water.

SUGGESTIONS FOR VALUE TEACHING

Read the following paragraph carefully. Think about its message for a few minutes. Discuss answers to the questions with some of your classmates.

"You have noticed many differences between dandelions and other flowers. Differences also occur between dandelions as they do among almost all other things. All these differences certainly make for a confusing world as a person tries to make some order out of them. Variety may be the spice of life but if more things were the same, it would be a simpler task to learn about the environment."

How do you feel about the author's viewpoint?

Can you think of five things about differences that you value?

How would you feel if all people were the same?

CLUES TO QUESTIONS

One environmental factor affecting stem length is the height of the surrounding vegetation.
The idea of taper can be seen in the structure of smokestacks, wooden telephone poles and even pyramids.

TROUBLE SHOOTING

- The students should practice measuring the thickness of dandelion flower stems. Although the differences are quite obvious to the eye, the measurements are quite small.
- The difference in stem thickness might be more readily seen if the lines are drawn to show thickness rather than recording the measurements in number form.

VOCABULARY

taper
boquet
dividers

Activity 4:
How alike are dandelion leaves?

TIME

one 45-minute period

SEASON

May, June or September

CLASS ORGANIZATION

individually or in small groups of two or three students

EQUIPMENT AND MATERIALS

For each group:
variety of dandelion leaves
writing materials
newspaper, kraft or poster paper

SKILLS AND TECHNIQUES

- observing carefully and making comparisons
- making inferences based on careful observations when answering *Digging Deeper* questions

CONCEPTS

Dandelion leaves vary greatly in size and shape on individual plants as well as among different plants.

SUGGESTIONS FOR VALUE TEACHING

Complete the following sentences:

I learned that ________________________ .
I was surprised that __________________ .
I realized that _______________________ .

Will you discuss your completed statements with classmates?

CLUES TO QUESTIONS

New dandelion leaves grow from the center of the plant.
The oldest (and longest) leaves are found at the bottom, closer to the ground.

TROUBLE SHOOTING

- A good sampling of different dandelion leaves should be obtained. It would be very useful to identify from where on the plant the leaves were obtained and where the plants were located.

- The leaves should be pressed and dried and then mounted on a bulletin board. One display could show leaf variation from one dandelion plant. Another display could show leaf variation among leaves taken from a number of plants. Labels could be pinned to the leaves to inform the observer where the leaves were obtained.

VOCABULARY

variation
lobe
notch

CROSS REFERENCES

Ecology in Your Community, pages 65 to 72.

TROUBLE SHOOTING

- The students should be careful when digging up dandelion plants to avoid damaging lawns.
- The leaves from a large dandelion plant can be displayed on the bulletin board, arranging the leaves as much as possible in the way in which they were found growing.

VOCABULARY

leaf arrangement
maximum

CROSS REFERENCES

Trees, pages 37 to 40, 61 to 64.

Activity 5:
How are dandelion leaves arranged?

TIME

one 30-minute period

SEASON

May, June or September

CLASS ORGANIZATION

individually or in small groups of two or three students

EQUIPMENT AND MATERIALS

For each group:
dandelion plants
garden trowel or digging tool
newspaper

SKILLS AND TECHNIQUES

- observing carefully
- making inferences based on careful observation when answering *Digging Deeper* questions

CONCEPTS

Dandelion leaves are arranged in an overlapping pattern so that they completely cover the ground making it extremely difficult for other plants to grow there.

CLUES TO QUESTIONS

The leaf arrangement of the dandelion could be described as whorled, or more specifically, a basal rosette.

Activity 6:
What kind of root does the dandelion plant have?

TIME

one 45-minute period

SEASON

May, June or September

CLASS ORGANIZATION

individually or in small groups of two or three students

EQUIPMENT AND MATERIALS

For each group:
dandelion plants
plantain plants
digging tool
newspaper

SKILLS AND TECHNIQUES

- digging up plants carefully
- observing carefully

CONCEPTS

The dandelion plant has a long, strong root that grows deep in the ground, insuring the plant of a constant supply of moisture.
The root and other parts of the dandelion plant contain a white sticky juice.
The long tap root of the dandelion makes it difficult to pull the plant from the ground.

SUGGESTIONS FOR VALUE TEACHING

Read the "Did You Know?" statements on page 20. List them according to the ones you are most interested in learning more about to the ones in which you are least interested.

Will you try to find out more about the ones in which you are most interested on your own time?

CLUES TO QUESTIONS

When dandelions are pulled up, part of the tap root usually remains in the ground and later forms a new plant. The latex found in the dandelion is sticky. The students could compare this juice with the latex found in the milkweed.

TROUBLE SHOOTING

- It is important that the entire root of the dandelions and plantains be obtained to make the best comparisons.
- The plants should be obtained from a vacant field or similar area because a shovel is required to dig up the entire plant. Do not obtain the plants from a lawn because the lawn will be damaged.

VOCABULARY

plantain
tap root
fibrous root
drought
latex
germinate
reproduce

3. DANDELION POPULATIONS

Activity 1:
What is the dandelion population of the school lawn?

TIME

one 45-minute period to construct quadrat frames
one 45-minute period to count and record the plants
one 45-minute period to do the mathematical calculations and consider the results

SEASON

May, June or September

CLASS ORGANIZATION

groups of four or five students
(These groups could remain the same for the activities in this chapter.)
Before starting this activity have the students read the introduction to this chapter in their small groups. Afterwards, discuss dandelion populations and ways to take samples with the whole class. The small group will have sufficient background to proceed with this activity by constructing their quadrats and using them to determine dandelion populations.

EQUIPMENT AND MATERIALS

For each group:
for each quadrat frame:
  4 pieces of pine lattice (110 cm long)
    or 2 cm x 5 cm strapping
    (This wood can be purchased inexpensively at a lumber store.)
  string
  common nails
hand drill with a 6 mm bit
hammer

SKILLS AND TECHNIQUES

- reading plans and using tools to make a quadrat frame
- measuring accurately
- calculating simple percent, average, and area
- using the random sampling technique described in the Introduction

DANDELION POPULATIONS?

- working together with members of the group to successfully complete the activity
- making inferences based on the data collected to answer the questions in the *Digging Deeper* section

CONCEPTS

Plant population studies show frequency of distribution, total population, and density of population.
The frequency of distribution is the number of units of area, usually expressed as a percentage of the total area, which have at least one sample plant growing in them.

The population count is often expressed as the total of the average number of sample plants found in each unit of area.
Population density is the average number of sample plants found in each unit of area.

SUGGESTIONS FOR VALUE TEACHING

When I am involved in an investigation studying dandelions such as this activity, I prefer:

- *to work alone.*
- *to work with a partner.*
- *to be a member of a larger group of four or five students.*
- *to watch the teacher do the activity.*

Discuss your choice and your reasons with other members of your group.

CLUES TO QUESTIONS

Answers will vary according to students' observations.
The greater the number of samples, the more accurate the results.

TROUBLE SHOOTING

- Hula Hoops divided into four sections can be used instead of quadrat frames for this activity.
- Students should be encouraged to establish the standards and procedures under which their group will operate before starting the activity.
- A fair selection of samples must be made to obtain valid information.

VOCABULARY

quadrat frame
random sampling
distribution
frequency
percentage
average
density
rectangular
plant population

CROSS REFERENCES

Mapping Small Places, pages 37 and 38.
Ecology in Your Community, pages 67 to 72.

Activity 2:
What changes take place in the dandelion population over a period of time?

TIME

four or five 15-minute periods once every two or three weeks

SEASON

May, June or September

CLASS ORGANIZATION

individually or groups of four or five students

EQUIPMENT AND MATERIALS

For each group:
quadrat frames
writing materials
small stakes

SKILLS AND TECHNIQUES

- mapping with accuracy
- using quadrat frames to record changes in dandelion populations

CONCEPTS

The dandelion population in an area changes over a period of time.

SUGGESTIONS FOR VALUE TEACHING

On the whole I thought this investigation was: (check one)

____ very poor
____ poor
____ fair
____ average
____ good
____ very good
____ excellent

The strengths of the investigation were
_______________________________ .
This investigation would have been better if we had ______________________ .
During our next investigation I would like to see us ___________________ .

Share the completed statements with other members of your group.

TROUBLE SHOOTING

- A protected area should be used where the stakes and the area under study will not be tampered with.
- At least two weeks should elapse between observations.
- Care must be taken that the same view of the permanent quadrat area is sketched each time.
- Care must be exercised by the students in sketching accurately so that the changing size of the dandelion plant can be readily noted.
- For a more interesting display, four or five maps of the area may be prepared. The first can be retained as is and the others can be revised up to certain stages, to show a four or five-step sequence.

CROSS REFERENCES
As for *Activity 1.*
Ecology in Your Community, pages 83 and 84.

Branching Out:

TIME
four or five 15-minute periods once every two or three weeks

SEASON
May, June or September

CLASS ORGANIZATION
individually or small groups of interested students

EQUIPMENT AND MATERIALS
For each group:
string
stakes
ruler
writing materials
graph paper

SKILLS AND TECHNIQUES

- constructing and using a line or belt transect
- recording observations on a chart
- inferring factors affecting plant growth, distribution and population

CONCEPTS
Changes in dandelion population are often related to environmental factors or conditions.

TROUBLE SHOOTING
As in the previous activity, four or five maps could be prepared.

VOCABULARY
line transect
belt transect
parallel
conditions

Activity 3:
How does the number of dandelion plants change over an area?

TIME
one 75-minute period

SEASON
May, June or September

CLASS ORGANIZATION
small groups of four or five students

EQUIPMENT AND MATERIALS
For each group:
string
writing materials
ruler

SKILLS AND TECHNIQUES

- measuring and counting with accuracy
- making and using a belt transect to collect data on dandelion populations

CONCEPTS
A belt transect is useful in measuring the change in population of a particular plant in an area.

SUGGESTIONS FOR VALUE TEACHING

In this chapter you have taken samples of dandelion populations by using different techniques. Which technique did you enjoy the most? The least?

____ *Hula Hoop*
____ *quadrat frame*
____ *line transect*
____ *belt transect*

Do you think you could use any of these techniques by yourself to help you find answers to environmental questions?

Do you think that you will use these techniques again without being told?

CLUES TO QUESTIONS

Answers will depend on student observations.

TROUBLE SHOOTING

- The area studied should show a definite change in numbers of dandelion plants from one place to another.

VOCABULARY

belt transect

CROSS REFERENCES

Trees, pages 87 to 90.

4. THE DANDELION AND THE MINI-CLIMATE

Activity 1:
How does the dandelion affect other plants growing near it?

TIME

several weekly 10-minute periods

SEASON

May, June or September

CLASS ORGANIZATION

individually or in small groups of two or three students

EQUIPMENT AND MATERIALS

For each group:
dandelion plant *in situ*
writing materials
ruler
  quadrat frame
  OR
  string
  popsicle sticks
  OR
  coathanger
  pliers
  wire cutters

SKILLS AND TECHNIQUES

- counting and recording carefully
- observing carefully
- making and using a quadrat

CONCEPTS

The arrangement of dandelion leaves blocks out the sunlight so that other plants cannot grow beneath it.

As the dandelion plant grows it crowds out the other plants.

CLUES TO QUESTIONS

Answers will depend on student observations.

TROUBLE SHOOTING

- A permanent quadrat can be made by simply measuring a square, placing a small stake in each corner, and enclosing the area with string.
- The permanent quadrat area should be protected from trampling and tampering.

VOCABULARY
foliage
intensity

Activity 2:
How much ground surface does a dandelion plant cover?

TIME
one 60-minute period to prepare the plastic sheet, to measure the dandelion plants, and to record the results
several weekly 10-minute periods to measure and record the surface area of the same dandelion plant

SEASON
May, June or September

CLASS ORGANIZATION
individually or in small groups

EQUIPMENT AND MATERIALS
For each group:
clear plastic sheets
felt pens
dandelion plants
writing materials

SKILLS AND TECHNIQUES
- counting and recording data accurately
- making line graphs
- drawing a grid
- calculating averages

CONCEPTS
Dandelion plants vary greatly in the amount of ground surface that they cover. Some factors affecting ground coverage are: age of the plant, moisture conditions, light conditions, competing plants, and mowing.

CLUES TO QUESTIONS
Answers will depend on student observations.

TROUBLE SHOOTING
- Some experimentation may be necessary to find a marking pen that will write well on the plastic.
- Care must be exercised by the students when lining the plastic sheet.

RESOURCES
Sheets of clear plastic may be obtained from firms selling graphic arts or drafting supplies, or from automotive or hardware stores.

CROSS REFERENCES
Mini-climates, page 71.

Activity 3:
How does a dandelion plant affect the temperature at the soil surface?

TIME
15 minutes to introduce activity and standardize thermometers
5-minute periods at hourly intervals throughout the day
30 minutes to answer *Digging Deeper* questions and discuss answers

SEASON
May, June or September

CLASS ORGANIZATION
small groups

EQUIPMENT AND MATERIALS
For each group:
thermometers (immersion type)
maximum-minimum thermometers (optional)
writing materials
dandelion plants
watch or clock

SKILLS AND TECHNIQUES
- graphing information
- using thermometers and maximum-minimum thermometers competently
- calculating averages
- using data collected to infer answers to questions in *Digging Deeper* section

CONCEPTS
Dandelion leaves have a moderating effect on the temperature of the ground and air beneath the leaves.

CLUES TO QUESTIONS
Answers may vary.

TROUBLE SHOOTING

- Immersion-type thermometers are best for measuring the temperatures.
- Avoid letting the direct rays of the sun shine on the thermometer bulbs because this would provide a temperature reading of the glass of which the thermometer is constructed rather than of the air or the ground.

VOCABULARY

maximum-minimum thermometer

CROSS REFERENCES

Mini-climates, pages 2, 15 and 16.

Activity 4:

How does a dandelion plant affect the amount of moisture in the soil?

TIME

5-minute periods for several days or assignment to be done at home

SEASON

May, June or September

CLASS ORGANIZATION

individually or in small groups

EQUIPMENT AND MATERIALS

For each group:

dandelion plant

SKILLS AND TECHNIQUES

- detecting differences in soil moisture by touch and by sight

CONCEPTS

The dandelion plant has a moderating effect on the amount of moisture available to the soil directly below it and on the rate at which moisture evaporates from the soil below it.

CLUES TO QUESTIONS

Although the ground on the bare surface was likely more moist than the soil under the dandelion plant at the beginning of the activity the answer should be clearly seen after a few days assuming of course that neither sample of soil has received additional watering during this period.

TROUBLE SHOOTING

- Since the students are using the sense of touch as a measuring tool to compare moisture content in the soil there is a possibility of dispute. This should cause no great difficulty if the students can be encouraged to withhold their judgments until after five or six days have passed when the evidence should be conclusive to all.

CROSS REFERENCES

Mini-climates, pages 25 to 27.

Activity 5:

What animals are found on and around the dandelion?

TIME

several 15-minute daily observation periods

SEASON

May, June or September

CLASS ORGANIZATION

small groups of two or three students

EQUIPMENT AND MATERIALS

For each group:

writing materials

dandelion plants

SKILLS AND TECHNIQUES

- observing and recording data

CONCEPTS

Insects and other animals feed on the dandelion or use it for shelter. Dandelion flowers have most animal visitors when the sun is shining brightly and the flowers are fully open.

SUGGESTIONS FOR VALUE TEACHING

What would happen to some animal populations if there were no dandelions? Would you agree with a person who wants to kill dandelions in vacant lots or open fields that are not being used for other purposes?

CLUES TO QUESTIONS

Answers may vary.

TROUBLE SHOOTING

- The dandelion should be observed on a variety of days -- sunny, cloudy, cool, warm, windy, calm and so on.
- It is best to observe a dandelion that is somewhat protected from traffic.
- If the students crowd too closely to the dandelion they might discourage animals from visiting it.

CROSS REFERENCES
Mini-climates, page 72.

Activity 6:
How do dandelions protect the soil from erosion?

TIME
one 45-minute period

SEASON
May, June or September

CLASS ORGANIZATION
small groups

EQUIPMENT AND MATERIALS
For each group:
2 cardboard milk cartons
light-colored paper
stones
elastic bands
magnetic compass
marking pen

SKILLS AND TECHNIQUES

- using a magnetic compass
- observing and comparing splash erosion

CONCEPTS
Dandelion-covered soil suffers less from splash erosion than bare soil.

SUGGESTIONS FOR VALUE TEACHING

"I would rather have a little soil erosion than fields and hills covered with unsightly dandelions and other weeds."

How do you feel about this statement?

CLUES TO QUESTIONS
Answers may vary.

TROUBLE SHOOTING

- Both splash pillars should point in the same direction for the best comparison to be made.
- The splash pillars should not be left out in the rain too long since some of the splash marks will be erased.
- Instead of waiting for rain, a rainfall can be simulated by watering from the same direction with a garden hose and nozzle with a fine spray.

VOCABULARY
splash pillar
splash erosion

CROSS REFERENCES
Mini-climates, pages 28 to 30.

Activity 7:
What happens to the dandelion plant during the winter?

TIME
several 10-minute periods

SEASON
late fall and early spring

CLASS ORGANIZATION
small groups of two or three students

EQUIPMENT AND MATERIALS
For each group:
writing materials
dandelion plant

SKILLS AND TECHNIQUES

- observing carefully
- recording observations
- making inferences based on observations to answer *Digging Deeper* questions

CONCEPTS
The leaves of the dandelion die and decay during the winter.
The root of the dandelion lives during the winter and grows new leaves when spring arrives.

SUGGESTIONS FOR VALUE TEACHING

Think about the activities that you have conducted in this chapter. Complete the following sentences:

Dandelions are ________________________ .
I was surprised to learn that ________ .
I was happy that ______________________ .
I was disappointed that _______________ .

CLUES TO QUESTIONS

Answers will depend on student observations.

VOCABULARY

humus

CROSS REFERENCES

Ecology in Your Community, pages 78 to 82.

5. A MOST PERSISTENT WEED

Activity 1:
How many seeds are produced by one dandelion flower head?

TIME

one 45-minute period

SEASON

May, June or September

CLASS ORGANIZATION

small groups of two or three students

EQUIPMENT AND MATERIALS

For each group:
writing materials
dandelion flowers that have turned to seed

SKILLS AND TECHNIQUES

- counting carefully
- finding an average
- making a chart to organize the findings

CONCEPTS

Many seeds are produced by each dandelion flower head.

SUGGESTIONS FOR VALUE TEACHING

If you lived next to a field in which thousands of dandelions were flowering and you were concerned that the seeds would be blown into your beautiful lawn by the wind, what would you do?

CLUES TO QUESTIONS

The greater the number of flower heads sampled the more accurate the results are likely to be. Because it is impractical to sample large numbers of dandelion flower heads, a reasonable number such as ten is chosen.

All of the plants suggested in the *Branching Out* section are similar in that they all produce great quantities of seeds to ensure that some of them will find a favorable area in which they can germinate and grow to maturity.

TROUBLE SHOOTING

- The students may encounter some difficulty in that the seeds may become scattered. The activity should be done in an area protected from wind.
- When collecting flower heads, students should be careful not to lose some of the seeds. One way to avoid this loss is to place each flower head in a container such as a plastic bag or pill vial.

VOCABULARY

average

CROSS REFERENCES

Ecology in Your Community, page 57.

Activity 2:
How long does it take for a dandelion flower to turn to seed?

TIME

Several very brief visits once every few days to observe the progress of the dandelion flower.

SEASON

May, June or September

CLASS ORGANIZATION

individually or in small groups of two or three students

EQUIPMENT AND MATERIALS

For each group:
writing materials
dandelion flowers

SKILLS AND TECHNIQUES

- observing carefully
- keeping an ongoing record for several days and making entries each day

CONCEPTS

Dandelion flowers turn to seed in relatively few days.

SUGGESTIONS FOR VALUE TEACHING

If you had several dandelions in your lawn that were developing flowers, would you:

____ *let them grow?*
____ *cut the lawn and the flower heads?*
____ *spray the weeds?*
____ *pull out the dandelions?*
____ *remove the flower heads?*

Explain your answers.

CLUES TO QUESTIONS

Not all dandelions require the same amount of time to turn to seed. All of the factors listed in the text will affect the time needed.

The shortest time for a flower head to turn to seed will be accomplished by a dandelion that receives optimum conditions of light, moisture, temperature, proximity to other plants, and so on.

TROUBLE SHOOTING

- The flowers must be carefully identified and in a protected place.

Activity 3:
How does the flower head change to make the dispersal of seeds easier?

TIME

one 45-minute period

SEASON

May, June or September

CLASS ORGANIZATION

individually or in small groups of two or three students

EQUIPMENT AND MATERIALS

For each group:
writing materials
dandelion flowers in bloom and in seed

SKILLS AND TECHNIQUES

- observing carefully
- sketching accurately

CONCEPTS

The flower head has a concave or saucer shape when the flowers are in bloom.
The flower head has a convex shape when the flowers have turned to seed.
The convex shape enables the seed to spread more easily because the seeds are spread further apart and can be blown free more easily by the wind.

SUGGESTIONS FOR VALUE TEACHING

Pick a dandelion flower head that has just bloomed, complete with the stem and place it in a glass of water. Watch it for several days. What happens to the stem? Measure it. Will the flower head turn to seed? How do your observations change your opinion of dandelions?

Would you change your answer for the values section of Activity 2?

TROUBLE SHOOTING

- There may be some difficulty in removing the florets because they are tightly packed together and because the plant material is very soft

VOCABULARY

concave
convex
dispersal

Activity 4:
How many seeds can a dandelion plant produce?

TIME

a three-week period of brief daily observations

SEASON

May, or earlier in some regions

CLASS ORGANIZATION

small groups

EQUIPMENT AND MATERIALS

For each group:
dandelion plants
writing materials

SKILLS AND TECHNIQUES

- performing mathematics skills in multiplication and averaging
- keeping daily records faithfully

CONCEPTS

A dandelion plant is capable of producing a vast number of seeds each year.

SUGGESTIONS FOR VALUE TEACHING

Dandelions are obviously hardy plants that produce a great quantity of seeds in short periods of time. List all of the ways that you could take advantage of this situation.

CLUES TO QUESTIONS

No new flowers will be produced after the dandelion plant has been struck by a severe frost.

TROUBLE SHOOTING

- The students will have to realize that the answers obtained are only approximate. Better answers can be obtained if several plants are observed and averaged and also if one plant could be observed for an entire growing season.
- The students may require some teacher assistance in doing the mathematics calculations.

VOCABULARY

growing season

Activity 5:
How well is the dandelion seed equipped for dispersal?

TIME

one 60-minute period

SEASON

May, June or September

CLASS ORGANIZATION

small groups of two or three students

EQUIPMENT AND MATERIALS

For each group:
dandelion seeds
magnifying glasses
radish seeds
containers of water
woolen sweater
watch
measuring tapes

SKILLS AND TECHNIQUES

- observing carefully
- sketching accurately

CONCEPTS

Dandelion seeds have a parachute-like attachment that enables them to be spread over large distances by the wind.
Dandelion seeds can float on water which aids in dispersal.
Dandelion seeds have a rough prickly surface that enables the seed to cling to surfaces. This assists in seed dispersal and also germination by permitting the seed to remain in one place.

SUGGESTIONS FOR VALUE TEACHING

Select another student and conduct a play. One student pretends that he owns a home and property that he tries to keep weed free. The other student is a neighbor who doesn't take care of his property and has lots of weeds like dandelions. Role-play a conversation that the two neighbors have over their fence.

CONCEPTS

Dandelion seeds may also be dispersed in mud clinging to animals' paws, or by clinging to fur.

TROUBLE SHOOTING

- A stepladder can be effectively used to drop radish and dandelion seeds from different heights.
- An encyclopedia will be useful in finding information about parachutes.

VOCABULARY

parachute
dispersal
adaptation

RESOURCES

encyclopedia

CROSS REFERENCES

Ecology in Your Community, page 57.

Branching Out:
How can a parachute be made?

TIME

one 60-minute period

SEASON

anytime

CLASS ORGANIZATION

small groups of two or three students

EQUIPMENT AND MATERIALS

For each group:
1 square of cloth, tissue paper or thin plastic sheeting
gummed reinforcement rings
string
paper clips
Plasticine

SKILLS AND TECHNIQUES

- following directions
- controlling variables

CONCEPTS

A parachute can slow down the speed with which an object falls.

CLUES TO QUESTIONS

A parachute increases the air resistance of the falling person or object by offering a large surface area.
Leonardo da Vinci illustrated the principle of the parachute in 1495. The first successful jump was made from a tower in 1783 by the French physicist Sebastian Lenormand. A later jump was made from a balloon in 1797 by Andre Garnerin. In 1947, three Russian parachutists made a jump of over 12 km.
Parachutes are also used to deliver cargo, food and medicine to remote areas, and as 'drogue chutes' to slow down jet aircraft, satellites, racing cars, manned missiles, and even ships.
Other similar seeds are produced by the thistle and milkweed.
The maple tree produces paired samaras which spin as they fall and are also blown by the wind. Burdocks produce burrs which cling to clothing or animal fur.
The witch hazel produces seed pods which pop open with explosive force in late fall, sometimes expelling the seeds as far as 6 m.

TROUBLE SHOOTING

- All of the materials should be gathered in sufficient quantity before the activity is started.
- During the planning stage each member of a group can be assigned a different parachute to make so that more experiments can be carried out.
- The variables that can be tested to discover the differing performance of parachutes provide an excellent opportunity for the students to conduct meaningful experiments.

VOCABULARY

canopy
scallops
guide lines

RESOURCES

Encyclopedia

CROSS REFERENCES

Trees, pages 91 and 92.

Activity 6:
How many dandelion seeds that are planted will actually grow?

TIME

20-minute period to start the activity
20-minute period to consider results
(Between these two periods would be daily observations and recording of information.)

SEASON

May, June or September

CLASS ORGANIZATION

small groups of two or three students

EQUIPMENT AND MATERIALS

For each group:
25 dandelion seeds
blotters
2 saucers
water

SKILLS AND TECHNIQUES

- controlling variables
- observing carefully
- calculating percentage

CONCEPTS

The number of seeds that germinate or sprout is calculated as a percentage. Not all seeds will germinate.

SUGGESTIONS FOR VALUE TEACHING

Science uses mathematics to describe what happens during an experiment. How do you feel about using numbers and calculations during your investigations?

Mark your position on the following scale line.

Mathematical Matthew uses numbers in all of his experiments because he thinks in the language of mathematics.	Mathless Matthias likes science experiments with plants and animals but avoids activities that include mathematics because numbers confuse him.

Explain your position on the scale line.

What are the advantages of using mathematics in science investigations?

What are the disadvantages of using mathematics in science investigations?

Will you try to be more like Matthew or Matthias in your future investigations?

CLUES TO QUESTIONS

The greater the number of samples or plant sources, the more reliable the results. Most seeds require warmth, moisture and air in order to germinate.

TROUBLE SHOOTING

- To obtain the best results the conditions of moisture and temperature must be provided that will cause maximum germination.
- Do not permit the blotters to dry out.
- Each group of students must faithfully tend their germination blotters every day. This is an opportunity to encourage the attitudes of perseverence and sticking to a task until it is completed.

VOCABULARY
germinate
germination rate
percentage
fraction
denominator

CROSS REFERENCES
Trees, pages 92 to 94.

Branching Out:

TIME
one 20-minute period to set up the activity
four 20-minute periods to observe and record

SEASON
May, June or September

CLASS ORGANIZATION
small groups of interested students

EQUIPMENT AND MATERIALS
For each group:
length of cloth
marking pen
seeds
water
elastic bands or string
jar and lid
writing materials

SKILLS AND TECHNIQUES
- following directions
- observing and recording
- calculating percentage
- comparing results

CONCEPTS
Seeds from different plants vary in germination time.
The vigor of sprouts varies.

TROUBLE SHOOTING
- Be sure to mark the sections with a waterproof marker.
- Flannel or terry cloth, which are absorbent, are excellent for the rag doll.

VOCABULARY
doll
seedling

Activity 7:
How do weed killers affect the dandelion?

TIME
two 20-minute periods
  one period to start the activity
  one period to consider the results
(Observations each day or two over a two-week period must also be made.)

SEASON
May, June or September

CLASS ORGANIZATION
small groups of two or three students
If one mixture of 2, 4-D is made in front of the whole class as a demonstration, each group can use it in turn to spray a dandelion in its study plot.

EQUIPMENT AND MATERIALS
For each group:
dandelion plants
weed killer containing 2, 4-D
writing materials
spraying apparatus or
watering can

SKILLS AND TECHNIQUES
- reading and carrying out directions
- observing, sketching and measuring
- using a control in an experiment

CONCEPTS
2, 4-D will efficiently and quickly kill dandelion plants.

SUGGESTIONS FOR VALUE TEACHING
How do you feel about intentionally killing a living thing?

Mark your position on the following scale line.

Let-Live Larry is so much against using weed killers that he lets all weeds grow in his lawn as though they were flowers.	Herbicide Herbie uses 2, 4-D so freely that he sprays his house plants and garden almost every day to get rid of weeds.

Explain your position on the scale line.

Why might some people feel strongly about not using 2, 4-D or other weed killers?

CLUES TO QUESTIONS
The chemical 2, 4-D causes such rapid growth in broad-leaved plants that the plant finally exhausts itself.

TROUBLE SHOOTING
- Care must be exercised when using 2, 4-D to avoid spraying flowers and other desirable plants. Spraying should be done on a relatively calm day.
- The 2, 4-D can be easily applied with a watering can.
- The directions for using 2, 4-D must be carefully followed.

VOCABULARY
2, 4-D
herbicide

RESOURCES
Hardware store

CROSS REFERENCES
Ecology in Your Community, page 6.

Activity 8:
How effective is 'digging out dandelions' as a way of eliminating them?

TIME
one 45-minute period followed by observation every day or two over a period of two weeks

SEASON
May, June or September

CLASS ORGANIZATION
small groups of two or three students

EQUIPMENT AND MATERIALS
For each group:
dandelion plants
knives
measuring tape

SKILLS AND TECHNIQUES
- observing a study plot for two weeks
- comparing before and after results
- using observations to infer answers to the questions in the *Digging Deeper* section.

CONCEPTS
Digging up dandelions is not an effective way to eliminate them because new plants grow from the root fragments that remain in the ground.

SUGGESTIONS FOR VALUE TEACHING
How would you feel if the government made laws that forbade the use of any weed killers for environmental reasons and the only way to get rid of dandelions would be to dig them out of your lawn? Can you think of other ways to control dandelions and other broad-leaved weeds?

TROUBLE SHOOTING
- Caution the students in the proper handling of knives.

Activity 9:
What effect does trampling have on the dandelion plant?

TIME
one 40-minute period to examine dandelion plants in a park or on a school lawn

SEASON
May, June or September

CLASS ORGANIZATION
entire class working as a group

SKILLS AND TECHNIQUES
- observing carefully

CONCEPTS
Dandelion plants can withstand trampling better than most plants.
Dandelion plants that are heavily trampled tend to be quite small.

CLUES TO QUESTIONS
Answers may vary.

CROSS REFERENCES
Mini-climates, pages 69 to 72.

Activity 10:
How does frequent mowing of a lawn affect the dandelion plants that are growing there?

TIME
one 45-minute period

SEASON
May, June or September

CLASS ORGANIZATION
small groups of four or five students

EQUIPMENT AND MATERIALS
For each group:

dandelion plants
writing materials
device to measure the angle of leaves

SKILLS AND TECHNIQUES
- measuring heights of dandelion plants
- counting dandelion leaves
- measuring accurately the angle at which dandelion leaves grow
- comparing plants in a field to those in a lawn
- recording data in a chart
- using data collected to infer answers to the *Digging Deeper* section

CONCEPTS
Dandelion leaves lie flat and grow close to the ground on mowed lawns.

Dandelion leaves grow at an angle to the ground and at a considerable height if the plant is growing among other taller plants.

The dandelion plant adjusts to the conditions in which it grows so that it is able to contain a maximum share of sunlight.

Dandelion flower stems grow short on mowed lawns and long in fields with tall weeds.

Dandelion plants require adequate sunlight in order to produce seed.

CLUES TO QUESTIONS
Answers may vary.

VOCABULARY
horizontal
angle

CROSS REFERENCES
Ecology in Your Community, pages 67 to 72.

Activity 11:
In what different ground conditions do dandelions grow?

TIME
one 60-minute period

SEASON
May, June or September

CLASS ORGANIZATION
all students working as a group or a teacher-conducted excursion

EQUIPMENT AND MATERIALS
writing materials
dandelion plants

SKILLS AND TECHNIQUES
- participating purposefully in a large group excursion
- recording observations in the form of a chart
- using recorded observations to infer answers to the *Digging Deeper* questions

CONCEPTS
Dandelions will grow in almost all types of soil.

Dandelions will grow in places where most other plants cannot exist.

CLUES TO QUESTIONS
Dandelions can be said to be exceedinly adaptable to, or tolerant of, different soil conditions.

Dandelions will cause asphalt to crack and/or heave.

TROUBLE SHOOTING
- Be sure that a sufficiently wide variety of different ground types are examined.
- Data sheets should be prepared for the activity.

CROSS REFERENCES
Ecology in Your Community, page 75 and 76.

Activity 12:
How is the root of the dandelion adapted to help it survive?

TIME
one 45-minute period

SEASON
early September

CLASS ORGANIZATION
small groups of two or three students

EQUIPMENT AND MATERIALS
For each group:
dandelion plants
shovels

SKILLS AND TECHNIQUES
- using observations of dandelion roots to infer answers to the *Digging Deeper* questions

CONCEPTS
Dandelion roots grow to a great depth enabling them to readily obtain moisture. Dandelions will thrive even when many other plants turn brown during long dry spells in the summer.

CLUES TO QUESTIONS
Answers may vary.
The longest roots are usually found in rich, loose soil.

TROUBLE SHOOTING
- Before digging in a lawn permission should be obtained from the owner. The lawn should be left in a good state when the activity is completed.
- It may be difficult to get the entire root because the end of the root may break off unless great care is exercised.

VOCABULARY
vegetation
drought

6. DALLYING WITH DANDELIONS

Activity 1:
Can you write your own legend about dandelions?

TIME
one 60-minute period

SEASON
anytime of the year but preferably when dandelions are growing

CLASS ORGANIZATION
individually

EQUIPMENT AND MATERIALS
writing materials

SKILLS AND TECHNIQUES
- writing a composition

TROUBLE SHOOTING
- This activity should be integrated with the regular language program of the students and the composition skills applied.

Activity 2:
Who was responsible for transporting the dandelion to all parts of the world?

TIME
a homework assignment

SEASON
anytime but preferably when dandelions are growing

CLASS ORGANIZATION
individually

EQUIPMENT AND MATERIALS
writing materials

SKILLS AND TECHNIQUES
- using reference materials ably

CONCEPTS
Dandelions are not native plants of North America. Like many other plants the dandelion was brought to North America by early explorers and colonists.

SUGGESTIONS FOR VALUE TEACHING

Read the poems on pages 63 and 64 of The Dandelion. *Choose one of the poems and copy it on a piece of paper. Place a plus (+) over a line, a phrase or word with which you agree. Place a minus (-) over a part of the poem that you do not like. Discuss your completed coded poem with a classmate.*

How does your classmate feel about the ideas expressed in the poem?

CLUES TO QUESTIONS
Some of the many weeds imported into Canada are: sow thistle, chicory, burdock, ox-eye daisy, plantain, burweed, Queen Anne's lace, rabbit's ear, buttercup, and chickweed.

TROUBLE SHOOTING

- This activity should be integrated with the Social Studies or History program.
- Precise answers to the problem are not likely to be found. Much must be inferred.

RESOURCES
Encyclopedia, history books, or library

Activity 3:
Can you write a poem about the dandelion?

TIME
one 60-minute period

SEASON
anytime but preferably when dandelions are growing

CLASS ORGANIZATION
individually

EQUIPMENT AND MATERIALS
writing materials

SKILLS AND TECHNIQUES

- writing a poem

TROUBLE SHOOTING

- This activity should be integrated with the language arts program. The teacher should teach the structure of poems and the skills involved in writing poetry. This activity can be a practical application of the knowledge gained in the language arts program. The technical details of poetry writing should not be stressed to the point where enjoyment is endangered.

Activity 4:
How can a lunch of dandelions be prepared?

TIME
one 90-minute period to prepare and consume the lunch

SEASON
May, June or September

CLASS ORGANIZATION
small groups

EQUIPMENT AND MATERIALS
For each group:
refer to the recipes in the previous *Branching Out* activity.

SKILLS AND TECHNIQUES

- following directions
- working together

CONCEPTS
Dandelion leaves are edible and can be prepared in many ways.

SUGGESTIONS FOR VALUE TEACHING

A knowledge of edible plants that can be found in nature can be a pleasant experience and can be useful in an emergency. Do you like to eat foods prepared from dandelion plants?

Mark your position on the following scale line.

Edible Eddie keeps a stock of all kinds of edible wild plants and eats them for breakfast, lunch and supper.

Yukkie Yul would rather starve than eat edible wild plants.

Explain your position on the scale. What is your favorite recipe? Under what conditions would you eat dandelions?

TROUBLE SHOOTING

- Students can be assigned to experiment with some of the recipes at home prior to the activity.
- Each group can be responsible for one item on the menu. The students can try to make the items a few times at home and then arrange to bring all the necessary materials and ingredients to school on the day of the activities. A few parents might be invited to assess the culinary skills of the students.

VOCABULARY

edible
pioneer

Activity 5:
How can dandelions be used to dye cloth?

TIME

two 45-minute periods

SEASON

May, June or September

CLASS ORGANIZATION

entire class working as a group

EQUIPMENT AND MATERIALS

dandelion roots
enamel kettle
water
alum
cream of tartar
washing soda
unbleached cotton, wool, rayon or linen

SKILLS AND TECHNIQUES

- following directions carefully
- measuring quantities

CONCEPTS

Dandelion roots are a natural dye source.

SUGGESTIONS FOR VALUE TEACHING

Satisfaction can come from attempting to duplicate some of the tasks of early pioneers. Would you like to return to the ways in which pioneers lived? What are some of the advantages? Disadvantages?

TROUBLE SHOOTING

- Close supervision should be provided for the part of the activity dealing with boiling water.

VOCABULARY

dye
permanent
tie-dyeing

Activity 6:
How can dandelions be used at play?

TIME

one 45-minute period during which the students can try as many dandelion games as possible

SEASON

May, June or September
(May is best because dandelion flowers are most abundant then.)

CLASS ORGANIZATION

small groups

EQUIPMENT AND MATERIALS

For each group:
Materials are dependent upon the games selected. Examine the pictures on page 69 for suggestions.

Activity 7:
How can sounds be made with dandelion stems?

TIME

one 30-minute period

SEASON

May, June or September

CLASS ORGANIZATION

small groups

EQUIPMENT AND MATERIALS
For each group:
dandelion flower stems
knives or (taped) razor blades
glasses
water
scissors

SKILLS AND TECHNIQUES

- following directions
- using trial-and-error to achieve a goal

CONCEPTS
An understanding of sound can be strengthened or developed by using dandelion flower stems.

CLUES TO QUESTIONS
The students should have many dandelion flower stems available because many attempts may be required before satisfactory sounds are produced.

TROUBLE SHOOTING
Care must be exercised in using knives and razor blades. If two-edged razor blades are used, one edge should be taped.

VOCABULARY
wind instrument
vibration
air column

Activity 8:
How can the dandelion puffball be preserved?

TIME
two 30-minute periods

SEASON
May, June or September

CLASS ORGANIZATION
small groups

EQUIPMENT AND MATERIALS
For each group:
dandelion puffballs
styrofoam pieces
pieces of fine wire

SUGGESTIONS FOR VALUE TEACHING
The title page of each chapter in The Dandelion *has a full-page photograph. Study each page and write a caption for each photograph. Compare your captions with other classmates'. From reading other people's captions can you discover how they feel about dandelions? How do you feel about dandelions?*

CLUES TO QUESTIONS
Small pieces of wire can be inserted in the stems of the dandelions to provide greater strength when pushing them into the sytrofoam.

TROUBLE SHOOTING

- This activity can be correlated with the art program. A number of preserved puffballs can be set aside for winter bouquets or other craft activities later in the year..

DATE DUE SLIP

DUE EDUC FEB 18 '83
RETURN FEB 14 '83
DUE EDUC AUG 04 '85
AUG 03 RETURN
DUE EDUC NOV 12 [illegible]
NOV 12 RETURN
DUE EDUC OCT 26 '86
OCT 28 RETURN
DUE EDUC NOV 03 '88
NOV 02 RETURN
DUE EDUC FEB 14 '89
FEB 14 RETURN
DUE EDUC JUN 04 '89
JUN 03 RETURN

DUE EDUC NOV 18 '91
DUE EDUC DEC 02 '91
NOV 27 1991 RETURN
DUE EDUC MAR 30 '92
1992 MAR 27 RETURN
DUE EDUC APR 10 '92
APR 03 1992 RETURN
DUE EDUC DEC 05 '95
RETURN NOV 22 '95

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THE DANDELION

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Astronomy
Birds
The Dandelion
Ecology in Your Community
Mapping Small Places
Mini-climates
Pollution
Running Water
Small Creatures
Snow and Ice
Trees
Your Senses

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HOLT, RINEHART AND WINSTON OF CANADA, L [redacted]